

REMARKS

Reconsideration of the present application as presently amended is respectfully requested. The present amendment is responsive to the Office Action dated March 29, 2004. Claims 1-23 are pending. Claims 1-5, 9-11 and 15-23 are rejected. Claims 6-8 and 12-14 are indicated allowable. Applicant thanks the Examiner for this indication of allowable subject matter. In response to this Action, certain claims have been amended and supporting arguments are presented to particularly point out and distinctly claim the subject matter that applicant regards as the invention. No new matter has been added.

THE INVENTION

The present invention is directed to a mixture of two particulate phases used in the production of a green compact that can be sintered at higher temperatures. The first phase contains particles that consist of a metal compound. As presently recited, the claims define that the metal compound comprises hydrides of at least one of the metals that form a sintered alloy. The second phase contains particles from the group of the inorganic compounds that do not release any decomposition products at temperatures of more than 400 °C, that are interstitially soluble in the sintering metal phase, and/or that react with the second phase to stable compounds.

The mixture, by providing the second phase, is effective in supporting the fine structure of the first phase against the forces of surface tensions during the sintering process. During sintering, the second phase remains thermally stable and substantially chemically inert with respect to the first phase. This is very different from the prior art cited in the outstanding rejection.

THE REJECTIONS UNDER 35 U.S.C. § 102

Claims 1-5, 9, 10, 13 and 14 had been rejected under Section 102 (b) as being anticipated by Saito et al. (U.S. Pat. No. 5,520,789). This rejection is respectfully traversed, particularly as applied to the claims as presently amended.

The Examiner cites col. 21, lines 11-23 as allegedly disclosing a mixture of a first phase of titanium and a second phase of NaCl inclusions. However, it is clear from this passage that Saito et al. is simply intending to make good use of an inexpensive titanium powder product having a high content of chlorine. In a sintering process, this material exhibits large pores that are considered undesirable. In this passage, Saito et al. recognizes that:

*"... large pores are not due to chlorine itself but due to coarse particulate inclusions such as NaCl or MgCl<sub>2</sub>."*

It is clear from this passage that Saito et al. regards the presence of NaCl as an impurity associated with this inexpensive high-chlorine titanium powder product. To overcome the problem of coarse residual pores, a "rubbing step" is where the titanium powder and the coarse inclusions are pulverized to a uniform particle size. As Saito et al. further states,

*"Thus, the rubbing step makes it possible to eliminate the coarse residual pores which have been considered inevitable in the case where a high-chlorine titanium powder is employed."*

Therefore, it is quite clear that Saito et al. does not disclose a process or related product that addresses the problems overcome by the claimed embodiments. Saito

et al. cannot be relied upon to show a first phase consisting of a metal compound to which a second phase is deliberately added to obtain desired properties. Saito et al. essentially begins with a two phase material where a second phase is an impurity, and desires to preclude the problems associated with the impurity. Thus, Saito in fact teaches away from the presently claimed embodiments.

As presently amended, claim 1 recites, "a first phase contains particles that consist of a metal compound, comprising hydrides of at least one of the metals that form a sintered alloy." A passage of Saito et al. at col. 11, lines 1-28 is cited for allegedly disclosing phases of titanium including an alloy phase and a hydride phase. This passage in fact discloses,

*"The titanium powder is one which is generally called pure titanium powder. Its typical examples include (a) sponge fines as a by-product of Hunter sponge titanium, (b) hydride-dehydride titanium powder produced by hydrogenation, crushing, and dehydrogenation of Kroll sponge titanium, etc."*

This passage simply refers to various known processes for producing "pure titanium powder." As explained by Saito et al. the hydrogenated titanium is "dehydrogenated" such that titanium hydride is not an end product. This is simply an incidental disclosure that does not properly show a metal hydride as a material used in a sintering process. In this respect also, Saito et al. teaches away from the presently claimed embodiments.

The Examiner also states that,

*"NaCl is used to treat the titanium powder and is not used in the compaction/sintering process, however, claim 1 does not require a sintering step, but states this as a possible use."*

As has been shown above, NaCl is not in fact used to treat titanium powder, but is

considered by Saito et al. to be an undesirable impurity, the problems of which are to be overcome in order to use an inexpensive titanium material product. As to the sintering step, claim 1 has been amended to recite "production of a green compact for sintering." In this way, the claim now positively recites sintering and therefore clearly requires the second phase inorganic material in a sintering process. This is clearly beyond the scope of Saito et al. reference.

For these reasons as indicated above and others, it is respectfully submitted that Saito et al. does not satisfy the requirements of anticipation as applied against the present claims. And the dependent claims are believed to be allowable for at least the same reasons as independent claim 1. Therefore, reconsideration and withdrawal of this grounds of rejection is respectfully requested.

THE REJECTIONS UNDER 35 U.S.C. § 112

Claims 11 and 15-23 had been rejected under Section 112, second paragraph, as allegedly being indefinite. These rejections are also respectfully traversed, particularly as applied to the claims as presently amended.

Claim 11 was rejected since the term "sintering" had lacked antecedent basis. This objection is overcome by changing the definite article to the indefinite article in this claim. Claims 15-20 had been rejected since the expression "capable of" in claim 14 was not deemed to be a clear limitation. This expression is deleted from claim 14 in the present amendment, thereby obviating the rejection of claims 15-20.

Claims 21-23 had been rejected for not setting forth any steps involved in the method/process. In response thereto, the limitation "a sintering process" has been added to claim 15, so as to characterize the step of "heating of the green compact

until the particles of the first phase are sintered so as to form an interconnecting pore structure" as recited in that claim. And since claims 21-23 depend from claim 15, it is respectfully submitted that these claims now recite "active, positive steps for delimiting how the use is actually practiced," as stipulated by the Examiner, and therefore the grounds of rejection is overcome.

Claims 21-23 had also been rejected under 35 U.S.C. § 101, as allegedly failing to set forth any steps involved in the process, resulting in an improper definition of a process. In response thereto, it is respectfully submitted that these claims depend from claim 18, which sets forth a sintering process. It should be appreciated that the sintering process is generally well-known for molding and fashioning articles of virtually any shape. Thus, it is respectfully submitted that the person skilled in the art would understand that such implementations as claimed and others could be fashioned in accordance with these steps. Reconsideration and withdrawal of this grounds of rejection is respectfully requested.

In view of the above, it is respectfully submitted that the present claims patentably distinguish over the prior art. A notice to that effect is earnestly solicited. If clarification of the amendment or application is desired, or if issues are present which the Examiner believes may be quickly resolved, the Examiner is invited to initiate a telephone interview with the undersigned to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. LUS-13047.

Respectfully submitted,

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